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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/111,454	07/08/98	BEN-PORATH	A 49959-013

MCDERMOTT WILL & EMERY  
600 13 STREET NW  
WASHINGTON DC 20005

LM31/0629

EXAMINER

BALI, V

ART UNIT	PAPER NUMBER
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2723

DATE MAILED: 06/29/00

*9*

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
**09/111,454**

Applicant(s)  
**Ben-Porath et al**

Examiner  
**Vikkram Bali**

Group Art Unit  
**2723**



☐ Responsive to communication(s) filed on \_\_\_\_\_.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-60 is/are pending in the application.

Of the above, claim(s) 9-17, 26-34, and 49-60 is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-8, 18-25, and 35-48 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4,5,6,8

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## **DETAILED ACTION**

### ***Election/Restriction***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-8, 18-25 and 35-48, drawn to classification of patterns, classified in class 382, subclass 224.
  - II. Claims 9-17, 26-34 and 49-59, drawn to defect detection, classified in class 382, subclass 149.
  
2. Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because it is directed to the classification of the patterns. The subcombination has separate utility such as defect detection.

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3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mike Messina, Reg. #33,424 on 6/2/2000 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-8, 18-25 and 35-48. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-17, 26-34 and 49-59 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(I).

#### ***Claim Objections***

6. Claim 25 is objected to because of the following informalities:

The claim should not be underlined, if the claim is not an amended claim.

Appropriate correction is required.

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***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

8. Claims 1, 2, 6, 18, 19, 23, 37, 40 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Takagi et al (US 5801965).

With respect to claim 1, Takagi discloses method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices comprising “imaging the surface (see figure 3, numerical 347, detector for the taking the image of the article); and “classifying the defect as being in one of a predetermined number of invariant core classes of defects”, (see figure 3, numerical 352, for classification of the defects detected) as claimed.

With respect to claim 2, he further discloses “core classes of defects comprise a missing pattern on the surface, an extra pattern on the surface, a particle on the surface, a particle

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embedded in the surface, and micro scratches on the surface”, (see figure 10, classification, which gives all the classes for classification of the defects) as claimed.

With respect to claim 6, he further discloses “classifying the defect as being in one of an arbitrary number of variant subclasses”, (see col. 13, lines 7-9, a cause model after the classification is done for the defects could well be the sub classification of the defects) as claimed.

Claims 18, 19 and 23 are rejected as claims 1, 2 and 6, because claims 18, 19 and 23 are claiming similar subject matter as claims 1, 2 and 6.

With respect to claim 37, he further discloses “an imager to produce an image of the defect and a reference image; storage device to store the defect image and the reference image; a comparator to compare the defect image and the reference image; and processor to classify the defect as being in one of a predetermined number of invariant core classes of defects”, (see col. 11, lines 40-50) as claimed.

With respect to claim 40, he further discloses “ storage device is a digital storage device”, (see figure 3, numerical 350) as claimed.

Claim 41 are rejected as claim 6, because claim 41 is claiming similar subject matter as claim 6.

9. Claims 1, 3, 6, 18, 20 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Mizuno (US 6047083).

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With respect to claim 1, Mizuno discloses method and apparatus for pattern inspection comprising “imaging the surface; and classifying the defect as being in one of a predetermined number of invariant core classes of defects”, (see col. 3, lines 57-58 and lines 39-40) as claimed.

With respect to claim 3, he further discloses “imaging the surface with a scanning electron microscope”, (see col. 3, lines 57-59) as claimed.

With respect to claim 6, he further discloses “classifying the defect as being in one of an arbitrary number of variant subclasses”, (see col. 3, lines 43-44) as claimed.

Claims 18, 20 and 23 are rejected as claims 1, 3 and 6, because claims 18, 20 and 23 are claiming similar subject matter as claims 1, 3 and 6.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 3-5, 7, 8, 20-22, 24-25, 35-36, 38-39, 42 and 46-47 are rejected under 35

U.S.C. 103(a) as being unpatentable over Takagi et al. (US 5801965) in view of Broude et al. (US 5814829).

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With respect to claim 3, Takagi discloses the invention substantially as disclosed and as described above in claim 1. However, he fails to disclose “imaging the surface with a scanning electron microscope” as claimed. But, it is well known in the art of inspecting an article to use a scanning electron microscope (SEM).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Takagi’s method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing a well known feature of inspecting method i.e. scanning the article using a SEM. This modification will provide an inspection system for an article that will use a SEM to scan the article such that the article gets scan to its best image.

Claims 20 and 38 are rejected as claim 3, because claims 20 and 38 are claiming similar subject matter as claim 3.

Claims 35 and 36 are rejected as claim 3, because claims 35 and 36 are claiming similar subject matter as claim 3.

With respect to claims 4 and 5, Takagi discloses the invention substantially as disclosed and as described above in claim 1. However, he fails to disclose “classifying a plurality of defects on the surface of the article; and determining a total number of defects in each of the core classes” and “generating an alarm signal when the total number of defects in a specific one of the core classes is equal to or greater than a first predetermined number” as claimed in claim 4 and 5 respectively. Broude in a system for inspection teaches “classifying a plurality of defects on the



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surface of the article; and determining a total number of defects in each of the core classes” and “generating an alarm signal when the total number of defects in a specific one of the core classes is equal to or greater than a first predetermined number”, (see Abstract, lines 2-12, wherein the flaws are detected and counted and the compared to an threshold and if the counter exceeds the threshold a signal is generated) as claimed in claim 4 and 5 respectively

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Takagi’s method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing a counter for counting the defects, comparing the counter to a threshold, and if the threshold exceeds a limit generating a signal as taught by Broude in his inspection system. This modification will provide an inspection system for an article that will detect the defects and classify the defects in the different classes and will have a counter for counting the defects, comparing the counter to a threshold, and if the threshold exceeds a limit generating an annunciation for the attendant to either stop the process or to slow down the process in order to get a better yield.

Claims 7-8, 21-22 and 24-25 are rejected as claims 4 and 5, because claims 7-8, 21-22 and 24-25 are claiming similar subject matter as claims 4 and 5.

Claim 39 are rejected as claims 4 and 5, because claim 39 is claiming similar subject matter as claims 4 and 5.

Claim 42 are rejected as claims 7 and 8, because claim 42 is claiming similar subject matter as claims 7 and 8.

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Claim 46 is rejected as claims 1, 2 and 3, because claim 46 is claiming the combination of all the limitations of claims 1, 2 and 3.

With respect to claim 47, Takagi further discloses “the classes of defects include the color of the surface”, (see figure 10, feature data) as claimed.

12. Claims 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 5801965) and Broude et al. (US 5814829) as applied to claim 38 above, and further in view of Shahar et al (US 5591971).

With respect to claims 43-45, Takagi discloses the invention substantially as disclose and as described above in claim 38. However, he fails to disclose “a plurality of spaced-apart detectors and a monitor to display images produced by the plurality of detectors”; “SEM comprises an SEM column, wherein a first one of the plurality of detectors is disposed inside the SEM column and a second one of the plurality of detectors is disposed outside the SEM column”; and “a first monitor for displaying an image produced by the first detector, and a second monitor for displaying an image produced by the second detector” as claimed in claim 43, 44 and 45 respectively. Shahar in a scanning electronic microcopy teaches “a plurality of spaced-apart detectors and a monitor to display images produced by the plurality of detectors”, (see figure 1, detectors 170, 240 and 250, and for the monitor see col. 1, line 27, wherein he teaches that the signal as received by the detector can be displayed i.e. there exist a monitor to display the signal);

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“SEM comprises an SEM column, wherein a first one of the plurality of detectors is disposed inside the SEM column and a second one of the plurality of detectors is disposed outside the SEM column”, (see figure 1, numerical 10 for the column, numerical 170 for the detector inside the column and numerical 240 for the detector out side the column); and “a first monitor for displaying an image produced by the first detector, and a second monitor for displaying an image produced by the second detector”, (see col. 1, line 27, wherein, it is obvious that a monitor is present to display the signals as the signals received by the detectors) a monitor as claimed in claim 43, 44 and 45 respectively.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Takagi's and Broude's method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing the detectors and the monitors as taught by the Shahar in scanning electron microscope for giving out a better perspective of the image. This modification will provide a SEM for an inspection system for an article that will have more than one detector to detect the reflected light and there by giving a better perspective of the article.

13. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 5801965) and Broude et al. (US 5814829) as applied to claim 46 above, and further in view of Tsuchiya et al (US 5960106).

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With respect to claim 48, Takagi and Broude discloses the invention substantially as disclose and as described above in claim 38. However, they fail to disclose “wherein the surface is glass, and the classes of defects include a particle embedded in the surface and substantially not protruding from the surface” as claimed. Tsuchiya in sample inspection method teaches “wherein the surface is glass, and the classes of defects include a particle embedded in the surface and substantially not protruding from the surface”, (see col. 2, lines 22-25, wherein, the glass substrate is inspected for the chrome depositing) as claimed.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Takagi’s and Broude’s method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing the glass substrate inspection for the embedded particles as taught by Tsuchiya in his sample inspection method. This modification will provide an inspection system for a glass article for inspecting the embedded particles on the substrate.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikkram Bali whose telephone number is (703) 305-4510.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

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Washington, DC 20231

or faxed to:

(703) 308-9051 (for formal communications intended for entry)

(703) 308-5393 (for informal or draft communications, such as proposed amendments to be discussed at an interview, please label "PROPOSED " or "DRAFT")


or hand-carried to:

Crystal Park Two,

2121 Crystal Drive,

Arlington, VA.

Sixth Floor (Receptionist)

  
Amelia Au  
Supervisory Patent Examiner  
Technology Center 2700

vb

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